Fig. 7. *Esperia socialis*, mihi: *a*, inflated end of acuate or large skeleton-spicule; *a'*, front view of anchorate spicule; *b*, lateral view of the same; *c*, bihamate spicule; *d*, bundle of minute acuate spicules (the two latter occurring in masses together); *c e*, lateral flukes; *f*, middle fluke; *g*, falcate septum; *h*, foot. Scale 1-12th to 1-6000th of an inch.

Fig. 8. *Carmia macilenta*, Gray: *a*, inflated end of acuate or large skeleton-spicule; *b*, front view of anchorate spicule; *a'*, lateral view of the same; *c*, bihamate spicule; *d*, tricurvate spicule; *e e*, lateral flukes; *f*, middle fluke; *g*, falcate septum; *h*, foot. Scale 1-12th to 1-6000th of an inch.

XXXVI.—*On the Claspers of Male Lizards* (Sauri).

By Dr. J. E. Gray, F.R.S. &c.

My attention has been drawn to this subject by the following circumstance:—

Mr. F. Moore, of the India Museum, has sent me a specimen to ask me if I can give him a clue to what it really is; it was sent, with some *botanical* products, from Bombay, where he believes it is used as an article of food; and "it has hitherto been supposed to be the root of a plant (*Cyclamen*), which of course it is not." Others have determined it to be a *Holothuria* or something of the kind, or a particular form of barnacle.

When it was soaked in hot water, so as to expand it, there was no doubt about its being part of an animal; and I was inclined to regard it as the penis of a lizard, from what I recollected of the form of that organ; and I was sure that it was part of a reptile, on account of the group of scales with which the base was covered.

But when I cut it open, I found that it was quite solid, and without any opening in any part of its surface for the emission of any secretion, and consisted of a pair of parallel cartilages covered with a skinny sheath, covered externally with horny plates, and having at the end a pair of exposed horny processes, which are divided at the end into several acute prominences, very unlike the structure of a penis.

On my showing the specimen to Dr. Günther and Mr. Edward Gerrard, they both determined that it was the penis of a lizard; and, at my request, Dr. Günther confirmed this determination by showing me the retracted penis of a Monitor preserved in spirits; and Mr. Gerrard showed me a stuffed specimen of *Varanus heraldicus* in the Museum, in which the penes were exserted; and there could be no doubt that we had rightly determined the true nature of the bodies which Mr. Moore had submitted to my inspection.

At the same time it was clear, from the structure that I had observed in examining the specimen, that the organs which have usually been regarded as the penes of lizards were not so in reality, and were merely claspers, by which the male kept the parts in position during coitus.

Cuvier, for example, in the 'Règne Animal,' in the character of lizards (*Sauri*), says the males "ont une double verge" (edition 2, vol. ii. p. 26). M. de Blainville, in his 'Tableaux du Règne Animal,' published in the Bulletin of the Philomathic Society, 1816, p. 119, and in his 'Organization of Animals,' makes a group for the lizards and snakes, which he calls "*Reptiles bipéniens.*" And I find even in Prof. Rolleston's 'Forms of Animal Life,' just published, that he says the copulative organs of the Squamata "consist of two protrusible or hollow conical bodies, which open into that cavity from behind" (p. lxi); and when describing a female snake, he says "it has two conic-shaped sacs, which correspond with the two intromittent organs of the male" (p. 82).

The claspers of the lizards, unlike those of the cartilaginous fishes, which are always external and exposed, are in the male retractile into a special cavity for their protection, in the sides of the under part of the tail of the animal, and are received into a couple of proper receptacles in the body of the female when the animals are *in coitu*. These organs appear to have been very little studied; for when I sent one of the specimens I received from Bombay to the College of Surgeons, Mr. Flower said that he was glad to retain it, as there was no preparation of the kind in their museum. Perhaps this explains why I could not find any figure or description of the penis of these lizards in Prof. Owen's work on the 'Anatomy of Vertebrates.'

M. Martin St. Ange, in his 'Études de l'Appareil reproducteur,' 1854, figures the organs of the green lizard and collared snake (t. 9 & 10); but he represents the "double penes" in their contracted, retracted state, giving no idea of the claspers when in use.

From the corrugated horny plates on the surface, they must offer considerable resistance against being withdrawn from the cavity in which they are enclosed when in copulation; but the lower end being first withdrawn after the connexion, the outer skin is reversed, and the horny part placed on the inner side, so that the drawing out of the claspers is performed without any inconvenience to the female.

The form of the claspers evidently differs in the species of the same natural family. In both the specimen received from Bombay and the specimen of *Varanus heraldicus* from

India in the British Museum, they are formed of two similar parts placed side by side, and united into one body, and provided with two terminal horny processes, which are of different shape in the two species. In both species they are large, subcylindrical, truncated at the end, and the flat termination is divided into several acute conical lobes. In the one from Bombay they are bent down on the body of the clasper, and in *V. heraldicus* they are much shorter and erect.

In a specimen in the Museum, also called *Varanus heraldicus*, which Dr. Günther showed to me, the clasper is subcylindrical, and terminates in only a single horny process divided and lobed at the end. I am not certain whether this is an individual malformation or a peculiarity of a distinct species; but I leave this for future research.

I have thought it well to figure (after they have been soaked in warm water to recover their natural appearance and size)

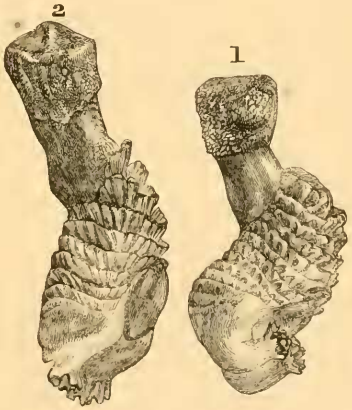

Fig. 1. Clasper from Bombay, nat. size.
Fig. 2. Clasper of *Varanus heraldicus*, nat. size.

the clasper of *Varanus heraldicus* and also that of the animal sold in the bazars of Bombay, I suspect as an aphrodisiac, of which the orientals are so fond.

Mr. Ford also informed me that he was once making a drawing of a chameleon at the Cape, for Sir Andrew Smith, when another specimen, which happened to be a female, was brought into the room; and the one that was sitting for his portrait, from being quite placid and slow, as is the manner of chameleons, suddenly (before he could have seen the female, but must have discovered her by scent) became excited, exceedingly rapid in his motions, rushing in search of the

female, and they were soon connected, and the claspers were inserted to the base.

The claspers of the snakes are covered with a number of slender spines on all sides, and they may often be seen protruding at the sides of the vents in specimens in spirits; and specimens with them so protruding are figured by Seba and other iconographers. Mr. Ford informed me that in the puff-adder the claspers are dark brilliant reddish purple, covered with abundant white recurved spines.

XXXVII.—*Sketch of a Natural Arrangement of the Order* Docoglossa. By W. H. Dall*.

The following is a preliminary sketch of a more natural arrangement of the Mollusca contained in the orders Cervicobranchiata and Cyclobranchiata of Gray, taken from the results of investigations now in preparation for publication in a more extended form. These investigations having shown that no line can be drawn between the two orders of Gray above mentioned, it follows that they must be consolidated; and for the group in question the order Docoglossa, Troschel (minus the *Polyplacophora* and *Solenoconchæ*), has been restricted and adopted. As the denominations previously applied all imply an erroneous idea of the structure of the animals, this course has been determined upon in preference to using prior, but incorrect, ordinal names.

The order, as here restricted, was first recognized by me in "A Revision of the Mollusca of Massachusetts" (Proc. Boston Soc. Nat. Hist. xiii. p. 245, March 1870), at which time only the characters of the suborder *Abranchiata* had been fully worked out. Since that time I have investigated the characters of the suborder *Proteobranchiata*, as here restricted; and in a paper read before the American Association for the Advancement of Science, at Troy, September 1870, of which a synopsis was published in the 'American Naturalist' (November 1870, p. 561), I restricted the order Docoglossa within its present limits, from the researches above mentioned. Among the fruits of these investigations was the definite exclusion of the *Gadiniidæ* from the order (see Am. Journ. Conch. 1870, vi. p. 8). It is proper to state that Prof. Theodore Gill had, upon general considerations, adopted the same limits for the order in his unpublished manuscript, although the conclusions to which I have been led were the result of independent ana-

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